

Remarks

Claims 1, 2, 17, 20, 23, 24, 36, 42 and 43 have been amended. Claim 65 has been added and claims 38-41 and 58-64 have been canceled. Review and reconsideration in light of the amendments are respectfully requested.

Claims 1, 2, 17, 20, 23, 24, 42 and 43 have been amended to correct various typographical errors (including changing "course" to "coarse"). Further ones of the other amendments are discussed in greater detail below.

Independent claim 1 is rejected over both U.S. Pat. No. 4,656,676 to Medwell and U.S. Pat. No. 5,799,271 to Hastings. In light of the amendments made to the claims, the rejection of claim 1 over the Hastings references is discussed first. At paragraph 7 of the Office action, claims 1, 5, 8, 11-13, 15, 17-19, 23, 27, 33-36, 42, 46, 49 and 52-57 are rejected as allegedly defining obvious subject matter over U.S. Pat. No. 5,794,271 to Hastings in view of the Japanese '106 reference and further in view of Fujino. However, claim 1 has been amended to clarify that the curing step occurs after the impregnating step. Support for this amendment can be found at, for example page 9, line 12 – page 10, line 4 of the application.

In contrast, in the Hastings reference the epoxy resin penetrates the second layer 20 (which has been construed as the fiber-based filler of claim 1) during the curing step (see column 2, line 66- column 3, line 1), and therefore does not disclose impregnating prior to curing. The method of the Hasting reference operates in this manner because the epoxy resin is cured to form a hardened third layer 22 (column 2, line 57-59) which is then placed on top of the second layer 20 (i.e., the fiber-based filler). The third layer 22 is then reheated to cause the epoxy resin 22 to reflow during the curing step and at that time impregnate the second layer 20.

In contrast, in the present invention the resin mixture may be impregnated into the fiber-based filler while the epoxy is still in its liquid state and prior to any curing. For example, Fig. 4 of the present application illustrates the resin being applied with a brush. At page 8, lines 12-13 it is noted that coarse ceramic particles are "mixed" into the resin which of course implies that the resin is in its liquid form. Further, at page 9, lines 3-5 it is noted that once the coarse

Serial No.: 09/689,131
Attorney Docket No.: 520219-273
Preliminary Amendment

ceramic particles are mixed into the resin, the mixture should be stirred to ensure that the ceramic particles remain evenly distributed throughout the thermoset resin.

Claim 1 has been amended to specify that the resin mixture is cured after the impregnating step. Claims 17, 36 and 42 have been amended in a manner similar to claim 1. Claim 23 has been amended to clarify that the resin mixture is a liquid, and that the coating and applying steps include coating and applying, respectively, the liquid resin. In contrast, as noted above, any "coating" or application of a resin of the Hastings reference occurs while the resin is in its solid form. New claim 65 depends from claim 1 and specifies that the thermoset resin is in a liquid form during the mixing step and the resin mixture is in a liquid form during the impregnating step. Thus it is submitted that the claims now further define over the Hastings reference, and it is requested that the rejection of those claims over the Hastings reference be withdrawn.

Turning next to the rejections over the Medwell reference, at paragraph 4 of the Office action, claims 1, 8, 11, 17, 42, 49, 52 and 56-57 are rejected as allegedly defining obvious subject matter over U.S. Pat. No. 4,656,674 to Medwell in view of the Japanese '106 patent and further in view of U.S. Pat. No. 5,630,230 to Fujino et al. Applicant's proposed amendment of November 12, 2003 addressed this rejection in detail. The Advisory Action mailed on December 3, 2003 indicated that the proposed amendment of November 12, 2003 would not be entered, and the Advisory Action also addressed the arguments included therein. Applicant thanks the Examiner for the detailed response in the Advisory Action. Because the proposed amendment of November 12, 2003 was not entered, the arguments presented in that Amendment are largely reproduced herein to ensure that such arguments are made of record in this application. Further, several additional arguments which address issues raised in the Advisory Action are also included.

Paragraph 4 of the final Office action takes the position that the Medwell reference discloses the basic claimed process of the invention, but does not teach a thermosetting resin-impregnated fabric having ceramic particles mixed therein. The Office action then takes the

position that it would have been obvious to one of ordinary skill in the art to use the ceramic particles of the Japanese '106 reference in the process of the Medwell reference.

Initially it is submitted that the final Office action does not include sufficient motivation for the proposed modification. The Office action relies upon the Fujino reference as allegedly providing the motivation to use the ceramic particles of the Japanese '106 reference in the system of the Medwell reference. However, it is submitted that the Fujino reference does not provide such a teaching. As noted at column 3, lines 19-22, in order to increase the evaporation rate of water absorbed into the hat of that reference, far-infrared radiation fibers which may include powder ceramics may be added to the non-woven fabric 23.

However, neither the Medwell nor the Japanese '106 reference are directed to or anywhere mention evaporative cooling. In fact, as can be easily appreciated firefighter helmets are desired to be water-repellent to avoid the additional weight, discomfort, and loss of thermal insulation that accompany water gain. Thus, it is submitted that the Fujino reference does not provide any motivation to one of ordinary skill in the art to utilize the ceramic particles of the Japanese '106 reference in the system of the Medwell reference.

It is noted that, at page 4 of the final Office action it is indicated that the Fujino reference “specifically” teaches that a high polymer mixed with ceramic particles “provides increased protection from infrared radiation.” However, it is submitted that this is not, in fact, the case. The Fujino reference discloses that “far-infrared radiation fibers” may be utilized to accelerate cooling due to evaporation (column 3, lines 19-22). Thus, the fibers, which are identified as “far-infrared” are in fact provided to accelerate evaporation, and not to increase protection from infrared radiation.

The Advisory Action then indicates that “increased protection from infrared radiation results if cooling is accelerated because sun rays are prevented from reaching the user of said molded helmet.” However, the Fujino reference only teaches that cooling is accelerated *if the helmet is dipped in and absorbs water* so that the far-infrared fibers can *accelerate evaporation*.

However, as noted above, the Helmet of the Medwell reference has an outer, hardened shell which would prevent the absorption of water.

Thus, the Fujino reference discloses the use of far-infrared radiation fibers to increase cooling by evaporation. The Fujino reference is provided as a reference which would allegedly teach one of ordinary skill in the art to use the ceramic particles of the Japanese '106 reference in the Medwell reference. However, given that the Medwell reference does not disclose the absorption and evaporation of water to cool the wearer, and in fact could not be used in such a manner, it is submitted that the Fujino reference does not provide a motivation to use the ceramic particles of the Japanese '106 reference in the Medwell reference.

The Advisory Action also indicates that if cooling is accelerated, then sun rays are prevented from reaching the user of the molded helmet. However, this statement is not fully understood and fuller explanation is respectfully requested. In particular, it is not understood how a cooler temperature can prevent sun rays from reaching a user.

The rejection of independent claims 17 and 42 is also traversed for the same reasons discussed above.

Furthermore, claim 1 has been amended to include the limitations of claim 58, and claim 58 has been canceled. Claim 1 now specifies that the coarse particles have an average size of between about 3 microns and about 1000 microns to improve the heat reflectivity of the helmet while maintaining sufficient strength of the helmet (see page 10, lines 12-15 of the specification). Further, due to the relatively large size of the ceramic particles, the ceramic particles become entangled with the fibers of the fiber-based filler during the curing process. This "entanglement" helps to avoid flowing of the ceramic particles to the "low spots" of the helmet and ensures a more even distribution of the ceramic particles (page 10, lines 15-19).

The final Office action does not indicate that the subject matter of claim 58 can be found in the prior art, but instead takes the position that "particle size is a result effective variable," citing to *In re Antoine* 559 F.2d 618 (CCPA). However, it is submitted that this rejection does not meet the *prima facie* standard required for obviousness rejections. In particular, the rejection

does not properly identify the scope and content of the prior art, identify the distinctions between the prior art and the claimed invention, provide a suggestion or motivation to modify a reference or combine references, show a reasonable expectation of success, or make a showing of all of the claim limitations. Instead, the rejection merely states particle size is a "result effective variable."

Further, it is not understood what a "results effective variable" is. It is speculated that this term means that a variable can simply be varied to achieve the desired result. However, the final Office action does not recite any "result" which the prior art seeks to achieve, nor does the Office action explain how varying particle size can help to achieve such a result. In particular, desired particle size depends upon the objective to be achieved and many other factors.

In fact, this case is analogous to the case cited in the Office action and relied upon in the rejection, *In re Antoine* 559 F.2d 618 (CCPA). In that case the Court of Customs and Patent Appeals held that the numerical ratio cited in the claims of that application were not obvious. The court held:

The PTO and the minority appear to argue that it would always be obvious for one of ordinary skill in the art to try varying every parameter of a system in order to optimize the effectiveness of the system even if there is no evidence in the record that the prior art recognized that particular parameter affected the result. As we have said many times, obvious to try is not the standard of 35 U.S.C. §103.

Id at 620.

Similar to the *Antoine* case, in this application there is no evidence that the prior art recognizes any criticality of particle size, and thus the authority cited in the Office action does not provide support for the rejection.

The Advisory Action indicates that the prior art "directly recognizes" that ceramic content is a results-effective variable. In particular, the Advisory Action notes that the Japanese '459 reference teaches a moldable mixture of thermosetting resin and ceramic particles in a content of 5-30 percent by volume. The Advisory Action then indicates that "the ceramic content determines the ceramic particle size."

Serial No.: 09/689,131
Attorney Docket No.: 520219-273
Preliminary Amendment

However, it is submitted that ceramic content does not in fact determine ceramic particle size. For example as noted in the Advisory Action "a larger number of smaller particles or a lower number of larger particles results in the same content of ceramic particles." Thus, as noted in the Advisory Action, a given ceramic content can be provided by any of a wide variety of ceramic particle sizes. Accordingly it is submitted that a reference which merely teaches a ceramic particle make-up by volume does not provide any teaching with respect to particle size.


The Advisory Action concludes that ceramic particle size is a result-effective variable. However, it is not understood what a results-effective variable is, nor how this supports a showing that the particle size of the present invention is taught by the prior art. Further explanation of this rejection is requested so that applicant can fully respond.

Thus, in sum, it is submitted that the amended claims now further define over the Hastings reference, and that the rejection of the claims over the Medwell reference does not have sufficient motivation. Finally, it is submitted that the specified particle size is not shown in the cited art. Accordingly, it is submitted that the application is in a condition for allowance and a formal notice thereof is earnestly solicited.

The Commissioner is hereby authorized to charge any additional fees required, including the fee for an extension of time, or to credit any overpayment to Deposit Account 20-0809.

The applicant(s) hereby authorizes the Commissioner under 37 C.F.R. §1.136(a)(3) to treat any paper that is filed in this application which requires an extension of time as incorporating a request for such an extension.

Respectfully submitted,

By 
Steven J. Elleman
Reg. No. 41,733